Draft Summary of the Engineering and Operations Work Group Meeting
Oroville Facilities Relicensing (FERC Project No. 2100)
February 27, 2004

The Department of Water Resources (DWR) hosted the Engineering and Operations Work Group (EOWG) meeting on January 30, 2004 at the Oroville Field Division in Oroville.

A summary of the discussions, decisions made, and action items is provided below. This summary is not intended to be a transcript, analysis of the meeting, or to indicate agreement or disagreement with any of the items summarized, except where expressly stated. The intent is to present an informational summary for interested parties who could not attend the meeting. The following attachments are provided with this summary:

Attachment 1 Meeting Agenda
Attachment 2 Meeting Attendees
Attachment 3 Report on Evaluation of Potential Generation Improvements (Study Plan E-3)
Attachment 4 Feather River Floodplain and Water Surface Profiles
Attachment 5 Emergency Action Plan (EAP) for Oroville Facilities
Attachment 6 Summary of Potential Sensitivity Analyses
Attachment 7 Resource Action Matrix
Attachment 8 Draft Write-up for E&OWG Discussion: Lake Oroville Oversight Committee, Resource Action EO5
Attachment 9 Temperature Control Actions – Decisions for WQRRS
Attachment 10 Thermalito Afterbay Average Daily Temperature Analysis
Attachment 11 Draft Write-up for E&OWG Discussion: Thermalito Afterbay Water Temperature Improvements: Construct Facilities to Convey Cold Water Directly to TAB Outlet Facility

Introduction

Attendees were welcomed to the EOWG meeting. The meeting agenda and desired outcomes were reviewed. The meeting agenda and list of meeting attendees and their affiliations are appended to this summary as Attachments 1 and 2, respectively.

January 30, 2004 Meeting Summary and Action Items

A summary of the January 30, 2004 EOWG is posted on the relicensing web site. The EOWG reviewed the status of action items from that meeting as follows:

Action Item EO#102: Revise Resource Action Matrix as discussed and distribute in advance of the next EOWG meeting.
Status: The revised matrix was distributed to the EOWG for review by the team on February 26, 2004.

Action Item EO#103: Prepare a write-up for EOWG review on preliminary modeling results and findings related to Resource Action EO1.
Status: The write-up was distributed to the EOWG in advance of the meeting, and a presentation on EO1 was included later in the meeting (see discussion below).

Action Item EO#104: Prepare a write-up on Resource Action EO10 for EOWG review.
Status: Curtis Creel (DWR) reported that the write-up needed to be revisited and suggested this action item be carried over to the next EOWG meeting.

Report on SP-E3

Howard Lee (MWH) led a discussion and review of SP-E3, Evaluate the Potential for Additional Generation Improvements. His presentation is provided as Attachment 3 to this summary. He

described the potential projects considered and identified the benefits and constraints associated with each one. If DWR determines any of these projects have positive cost/benefit ratios, a decision will be made on whether to include any of them in the license application. Howard noted that equipment upgrades do not require license amendment. Curtis Creel suggested that DWR would rather not release more water simply to generate energy but would prefer to generate additional energy utilizing pumpback capabilities or during flood releases. The EOWG discussed the potential to install generating units at Thermalito Afterbay Outlet and potential conflicts with anglers and fisheries interests.

Feather River Floodplain and Water Surface Profiles
Rashid Ahmad (DWR) distributed a package including maps developed during a new floodplain mapping study (see Attachment 4). The report contains background information and a short description of the study in addition to an orientation map, water surface profiles and 12 sheets of floodplain/floodway maps. The maps include 500-year flood and 100-year flood inundation areas and the 100-year floodway boundary map.

Emergency Action Plan (EAP) for Oroville Facilities
Rashid Ahmad also distributed Oroville Dam failure inundation maps developed and approved for the Emergency Action Plan (EAP) (see Attachment 5). He explained that these maps are used for emergency notification and floodplain planning purposes. Rashid will distribute the Thermalito Afterbay inundation map at the next EOWG meeting.

Modeling Scenario Update
Curtis Creel briefed the EOWG on the modeling scenarios and distributed a CD containing modeling results from the Existing Conditions Benchmark Study from 1964-1968. The Facilitator will mail copies of the CD to Ken Kules (MWD) and David Purkey (NHI), who were participating in the EOWG by teleconference. He distributed a revised Summary of Potential Sensitivity Analyses (see Attachment 6) and explained that the models that are highlighted in yellow are currently being worked on, while the blue highlights the completed runs. All revisions to the summary are indicated in red. Curtis explained that the next priority will be Scenario 23, and he is working closely with the Environmental Work Group (EWG) to develop target criteria to achieve project and environmental objectives and to look at spring operational changes that might result in higher water temperatures for agricultural interests. Curtis expects to present results from Scenario 23 in April.

Revised Resource Action Matrix
The EOWG discussed revisions to the Resource Action Matrix (see Attachment 7), and Curtis described the current status for each proposed resource action. Curtis noted that a report on EO1 indicates the need for additional analysis; and EO5 has been described as an important concept to be discussed during settlement, once actions are identified that will need oversight (see Attachment 8). He suggested that DWR develop a one-page write-up on EO10 to be discussed during settlement and noted there is no technical information to develop for the proposed resource action.

Temperature Control Actions – Decisions for WQRRS
Art Hinojosa presented results from efforts to model temperature control actions (TCAs) for WQRRS (see Attachment 9). Using graphs of WQRRS model output Arthur described the logic for evaluating various temperature control actions to meet Feather River Fish Hatchery temperature objectives and Robinson Riffle temperature objectives. Attachment 9 reflects an iterative analysis of the model output.

The step 1 line reflects the temperature absent any control actions. The actions begin with removal of intake shutters to access cooler water from the lake (step 2). If that action does not prove sufficient, any existing pump-back operations are suspended (step 3). If the

temperatures still do not meet maximum objectives, the final action (step 4) is use of the river valve and constant generation through the day (commonly called de-peaking or flattening the schedule). Finally, if the objective at Robinson Riffle is not met an additional 200 cfs is released down the low-flow channel (and subsequently reduced from Thermalito Afterbay Outlet releases.)

The TCA steps described above are preliminary. Although the TCAs probably will not change, their use may differ once WQRRS is recalibrated and refined.

Modeling Results CD and Tools
Bill Smith of Surface Water Resources, Inc. explained how to use the modeling analysis tool that Curtis distributed on CD during the modeling scenario update. Bill walked the EOWG through the use of the modeling tool and explained how to use the various files. He advised all users to read the Read Me file first and to use caution when changing values in the model. He described the daily temperature summary, exceedance plots and how to run daily scenario comparisons between two databases.

Thermalito Afterbay Average Daily Temperature Analysis
Lori Brown of DWR presented graphs of actual Thermalito Afterbay average daily water temperatures for May 2003 though August 2003 (see Attachment 10). The general observation was that the average daily water temperature at Western Canal was one-half a degree Fahrenheit higher, Sutter Buttes Canal was 4 ^{o}F higher, and Thermalito Afterbay Outlet was 5 ^{o}F higher than the average daily water temperature at the tailrace of Themalito Pumping-Generating Plant. Lori also discussed the potential effect that large increases in diversions could have on water temperature.

Discussion of Resource Action EO1
Lori Brown presented an analysis of daily average water temperatures in Thermalito Afterbay (see Attachment 11). Lori discussed the potential to construct a new canal to re-direct cold water to the Feather River allowing water to warm through longer residence time in Thermalito Afterbay prior to delivery through irrigation canals to farmers (see Attachment 10). The proposed canal would be approximately one mile in length with a preliminary cost estimate of approximately $20 million to construct. The EOWG discussed results of the temperature analysis indicating a four degree temperature difference between Thermalito Afterbay Outlet and Western Canal's irrigation diversion point; EOWG also discussed the potential to increase residence time within Thermalito Afterbay through construction of dams and a baffle system using sheet piles to direct water through a longer conveyance route before delivery to Western Canal. The EOWG discussed the desired goal for this resource action and potential constraints to the proposed canal construction. DWR suggested it could continue analysis of this potential action, including discussions with the EWG related to environmental effects of such an action. Howard Lee added that economic considerations should be factored into the analysis of alternatives ways to achieve this goal. The EOWG will review the write-up and provide DWR with comments by March 12, 2004.

Next Steps
The EOWG agreed to schedule the next EOWG meeting as a conference call between the Oroville Field Division, Joint Operations Center, and San Joaquin Field Office as follows:

Date: March 26, 2004
Time: 9 a.m. – 12 p.m.
Location: Conference call

Action Item

The following action items were identified by the EOWG and includes a description of the action, the participant responsible for the action, and due date.

Action Item EO#105:	Distribute the Thermalito Afterbay inundation map.
Responsible:	DWR
Due Date:	March 26, 2004
Action Item EO#106:	Mail CD to Ken Kules and David Purkey.
Responsible:	Facilitator
Due Date:	March 1, 2004
Action Item EO#107:	Provide comments on EO1 write-up to DWR. DWR will provide revised text to EOWG in advance of the March 26, 2004 EOWG meeting.
Responsible:	EOWG/DWR
Due Date:	March 12, 2004/March 19, 2004
Action Item EO#108:	Prepare write-ups on Resource Actions EO2 and EO3 based on modeling activities by the next Operations Modeling Workshop.
Responsible:	DWR
Due Date:	April 30, 2004